DSBA 7003	Optimization through Spreadsheet	L	T	P	C
Version 1.0		0	0	2	2
Pre-requisites/Exposure	Knowledge of basic mathematics & basic Statistics				
Co-requisites	--				

Course Objectives

1. To train the students in statistical and mathematical analysis to deal with primary & secondary data using computational techniques.
2. To undertake the research and how the information is sought
3. To give a meaning interpretation to the data set so as to solve the business problem

Course Outcomes

On completion of this course, the students will be able to

CO1. To have clear conceptual knowledge of statistical and mathematical analysis to deal with spreadsheet data using computational techniques
CO2. To be able to take up research and data collection
CO3. To analyze the data set so as to solve the business problem
CO4. To apply probability to deal with business problems involving uncertainty
CO5. To utilize statistical tools like correlation and regression to find the relationship between variables for forecasting

Catalog Description

Spreadsheet Modeling Training deals with using statistical and mathematical analysis to understand the principles of Operations Management and Supply Chain Management. Modeling involves the use of Microsoft excel to solve complex problems by the use of solver and finding out optimum solutions.

Course Content

Unit I: 8 lecture hours

- Fundamentals of Supply Chain Management, Overview of Supply Chain Models and Modeling system, Integrated Supply Chain management and Modeling,
- Effective use of spreadsheets for modeling, Review of key Excel functions
- Linear Programming Modeling, Interpreting of Linear Programming Model, Multiple objective optimization, Simplex Method

Unit II: 8 lecture hours

- Mixed integer programming modeling, Transportation Models, Branch and Bound method
- Facility Location & Layout, Capacitated Plant location problem, Gravity location model, Network Optimization
- Heuristic methods for combinatorial problems, Overview of unified optimization models, Simulation Models
- Time series model, Exponential Smoothing, Errors in forecasting

Unit III: 8 lecture hours

- Scenario Planning, Contingency Planning, Decision Trees

- Classical inventory models, Inventory deployment models, Optimization methodology applied to Vehicle routing
- Karl Pearson's Coefficient of Correlation, Correlation for Bivariate Frequency Distribution, Line of Regression

Text Books

1. Shapiro, James F., Modeling The Supply Chain, Thomson, 2nd Edition; Cengage
2. Ash Narayan Sah; Data Analysis using Microsoft Excel
3. Sharma J K; Operations Research: Theory and Applications; 4e; McMillan

Reference Books

1. Vohra N D; Quantitative Techniques in Management; 4e; TMH
2. Fundamental Methods of Mathematical Economics by Alpha C. Chian, Pub: McGraw Hill
3. Supply Chain management by Chopra, Meindl, Kalra

Modes of Evaluation: Quiz/Assignment/ presentation/ Written Examination
Examination Scheme:

Components	Assignment	Excel Based	Group Project	Quiz
Weightage (%)	30	20	30	20

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	COURSE OUTCOMES (COs)	**POs**
CO 1	To have clear conceptual knowledge of statistical and mathematical analysis to deal with spreadsheet data using computational techniques	PO 1,2, 3,4,7,8,9,10, 11,13, 14
CO 2	To be able to take up research and data collection	PO 1,2, 3, 7,8,9,10, 11,14
CO 3	To analyze the data set so as to solve the business problem	PO 1,2, 3, 8,9,10, 11, 13,14
CO 4	To apply probability to deal with business problems involving uncertainty	PO 4,5, 8,12,13, 14
CO 5	To utilize statistical tools like correlation and regression to find the relationship between variables for forecasting	PO 1,2,3,4,5,8,9,11

Program Outcome / Course Outcome mapping

Course Outcomes	CO 1	CO 2	CO 3	CO 4	CO5
PO 1	3	3	3	2	3
PO 2	3	3	3	2	3
PO 3	3	3	3	2	3
PO 4	3	1	1	3	3
PO 5	2	2	1	3	1
PO 6	1	1	1	1	1
PO 7	3	3	1	2	2
PO 8	3	3	3	3	3
PSO 9	3	3	3	1	1
PSO 10	3	3	3	2	1
PSO 11	3	3	3	2	2
PSO 12	1	1	1	3	2
PSO 13	3	1	3	3	3
PSO 14	3	3	3	3	3

		Students will be able to develop and evaluate alternate managerial decisions and identify optimal solutions	Students will demonstrate effective application capabilities of their conceptual understanding to the real world business situations	Students will be able to exhibit effective decision making skills, employing analytical and critical thinking ability	Students will demonstrate effective oral and written communication skills in the professional context	Students will able to work effectively in teams and demonstrate team building capabilities	Students will exhibit leadership and networking skills while handling business situations	Students will demonstrate sensitivity towards ethical and moral issues and have ability to address them in the course of business	Students will demonstrate employability traits in line with the changing dynamics of the industry	Students will demonstrate strong conceptual knowledge in the functional area of management as well as LSCM domain	Students will demonstrate effective understanding of relevant functional areas of management and their application in LSCM	Students will demonstrate analytical skills in identification and resolution of business problems pertaining to LSCM & general management	Students will exhibit the ability to integrate functional areas of management with domain perspective for the purpose of planning, implementation & control of LSCM	Students will have global perspective towards business situations in the area of LSCM	Students will exhibit deployable skills pertinent to the LSCM sector
Course Code	Course Title	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 9	PSO 10	PSO 11	PS12	PSO 13	PSO14
DSBA 7003	**Optimization through Spreadsheet**	3	3	3	2	2	1	3	3	2	2	3	2	3	3

1 – Weakly mapped
2 – Moderately mapped
3 – Strongly mapped

Model Question Paper

Name:

Enrolment No:

Course: DSBA 7003 – **Optimization through Spreadsheet**

Programme: MBA (LSCM) **Semester: 2nd-2016-18**

Time: 03 hrs. **Max. Marks:100**

Instructions:

Attempt all questions from **Section A** (each carrying 2 marks); any **Four Questions** from **Section B** (each carrying 5 marks)**. Section C** is Compulsory (carrying 15 marks)**, Section D** is Compulsory (carrying 30 marks)

Section A (All Questions are Mandatory)

1	Design analysis	**[2]**	**CO1**
2.	Simulation Models	**[2]**	**CO2**
3.	Model Definition	**[2]**	**CO2**
4.	G.B.Dantzig design the "simplex method"	**[2]**	**CO3**
5.	Linear programming	**[2]**	**CO3**
6.	Intertemporal integration	**[2]**	**CO2**
7.	Prediction of demand	**[2]**	**CO5**
8.	Managerial Decision Making	**[2]**	**CO2**
9.	Integer Programming	**[2]**	**CO3**
10.	Shadow Price	**[2]**	**CO4**
	SECTION B (Attempt any **Four Questions)**		
1.	What are the various assumptions of Linear Programming models?	**[5]**	**CO3**

2.	What is a linear programming model? What are its components?	**[5]**	**CO3**
3.	What are the various steps in decision making?	**[5]**	**CO2**
4.	Explain efficient frontier of cost versus delivery time diagrammatically?	**[5]**	**CO4**
5.	What are the various types of models? Explain.	**[5]**	**CO1**
	SECTION C (Attempt **all Questions)**		
6.	Use graphical model to solve the following LP problem Maximise $Z = 2x_1 + x_2$ Subject to the constraints i) $x_1 + 2x_2 <= 10$ ii) $x_1 + x_2 <= 6$ iii) $x_1 – x_2 <= 2$ iv) $x_1 -2x_2 <=1$ and $x_1, x_2 >=0$	**[15]**	**CO3**
7.	Build a mathematical model for the below question Two types of products Labor limit (Labor days availability : 200,000 days/mo) Materials limit (Materials availability: 8,000,000 kg/mo) Marketing lower limits (product 1 = 100, product 2 = 200) Unit profit (product 1 = $8,000, product 2 = $12,000) Unit consumption labor (days/unit (product 1 = 300, product 2 = 500) Unit consumption materials (kg/unit) (product 1 = 10,000, product 2 = 15,000)	**[15]**	**CO4**
	SECTION D (Compulsary**)**		
8.	The ABC company has been a producer of picture tubes for television sets and certain printed circuits for radios. The company has just expanded into full scale production and marketing of AM and AM-FM radios. It has built a new plant that can operate 48 hours per week. Production of an AM radio in the new plant will require 2 hours and production of AM-FM radio will require 3 hours. Each AM radio will contribute Rs. 40 to profits while an AM-FM radio will contribute Rs. 80 to profits. The marketing department, after extensive research has determined that a maximum of 15 AM radios and 10 AM-FM radios can be sold each week. a) Formulate a linear programming model to determine the optimum production mix of AM and FM radios that will maximize profits. b) Solve the above problem using the graphical method	**[30]**	**CO3**